

17. (Once Amended) A sequential method for integrated, in-situ modification of a substrate and subsequent atomic layer deposition of a thin film onto said substrate in an evacuated chamber beginning with initial modification steps, comprising:

introducing at least one first radical generating feed gas into said chamber;

introducing at least one ion generating feed gas into said chamber;

generating a plasma from said radical generating feed gas to form radicals and from said ion generating feed gas to form ions;

exposing said substrate to said radicals;

reacting said substrate with said radicals to remove any contaminants from said substrate and producing a modified substrate; and

following said initial modification steps, performing an atomic layer deposition of a thin film onto said modified substrate in said chamber including:

introducing a first reactant gas into said chamber;

adsorbing at least one monolayer of said first reactant gas onto said modified substrate;

evacuating any excess said first reactant gas from said chamber;

introducing at least one additional radical generating feed gas into said chamber, said additional radical generating feed gas <sup>and</sup> may be the same feed gas as said first radical generating feed gas;

generating a second plasma from said additional radical generating feed gas to form additional radicals;

exposing said modified substrate to said additional radicals; and

reacting said adsorbed monolayer of said first reactant gas with said additional radicals to deposit said thin film.

*Cont'd.*  
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19. (Once Amended) A sequential method for integrated, in-situ modification of a substrate and subsequent atomic layer deposition of a thin film onto said substrate in an evacuated chamber beginning with initial modification steps, comprising:

introducing at least one first radical generating feed gas into said chamber;

generating a plasma from said radical generating feed gas to form radicals;

exposing said substrate to said radicals;

reacting said substrate with said radicals to remove any contaminants from said substrate and producing a modified substrate; and

following said initial modification steps, performing an atomic layer deposition of a thin film onto said modified substrate in said chamber including:

introducing a first reactant gas into said chamber;

adsorbing at least one monolayer of said first reactant gas onto said modified substrate;

evacuating any excess said first reactant gas from said chamber;

introducing at least one additional radical generating feed gas into said chamber, said additional radical generating feed gas <sup>may</sup> be the same feed gas as said first radical generating feed gas;

generating a second plasma from said additional radical generating feed gas to form additional radicals;

exposing said modified substrate to said additional radicals;

reacting said adsorbed monolayer of said first reactant gas with said additional radicals to deposit said thin film; and

repeating each of the aforementioned steps for each film deposition layer.